Fwd: Appendix B Tables

brent.pace@bp.com

Sat 5/31/2014 3:55 PM

PSD

To:Robinson, James C. <robinsjc@dhec.sc.gov>;

4 attachments

image001.jpg; ATT00001.htm; Appendix B Tables-DHEC.xlsx; ATT00002.htm;

James

Take a look at the email below as it explains further what each table is.

Brent Pace

Begin forwarded message:

From: "Doerner, Michael" <MDoerner@trcsolutions.com>
To: "Pace, Brent A" <Brent.Pace@bp.com>
Cc: "Riley, Mike" <MRiley@trcsolutions.com>, "VandenMeiracker, Robert" <RVandenMeiracker@trcsolutions.com>, "Bailey, William" <WBailey@trcsolutions.com>
Subject: Appendix B Tables

Brent;
Here is explanation for the Appendix B tables. They are to provide the PTE and actual emissions for the project PSD analysis and to provide the information to complete the information required for the DHEC form 2569.
From Form 2569
C. SUMMARY OF PROJECTED CHANGE IN FACILITY WIDE POTENTIAL EMISSIONS
(Calculated at maximum design capacity.)

1. Pollutants

2. Emission Rates Prior to
Construction / Modification (tons/year)

3. Emission Rates After
Construction / Modification (tons/year)

Uncontrolled

Controlled

Limited

Uncontrolled

Controlled

Limited

Table B-12 Uncontrolled Facility-Wide Totals -
Pre-Project

Table B-19
Pre-Project facility Wide PTE

N/A

Table B-12 Uncontrolled Facility-Wide Totals Post-Project

Table B-11
Facility Wide Post project

N/A

Table B-1 Summary of Project PSD Analysis
Tab le B-2 to B- 6 & B-8 to B-10 Individual unit calculation that feed into Table B-1
Table B-7 Fugitive calculations that feed into Tables B-2, 3 & 8
Table B-11 Summarizes the Facility Wide Post Project emissions from tables B-2 to 8 and B-26
Table B-12 Summarizes both Pre & Post project Uncontrolled emissions from Tables B-13-17
Table B-13-17 calculate Uncontrolled pre & post project emissions for modified units
Table B-18 Calculates Uncontrolled fugitives to use in Tables B-13-17
Table B-19 Summarizes Pre-project controlled emissions
Table B-20-24 Calculates Pre-project emissions for modified units
Table B-25 Calculates fugitive emissions for modified units pre project
Table B-26 Summarizes Controlled & Uncontrolled emissions for unmodified units
Tables 27 to 29 Calculates controlled & uncontrolled emissions for unmodified units
Tab le 30 Calculates HAPs emissions
Table 31 List cooling tower PM emission factors

Michael A. Doerner
Air Quality Specialist

[cid:image001.jpg@01CF7C19.03B98430]

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Flickr<http://www.flickr.com/photos/trcsolutions/> | www.trcsolutions.com<http://www.trcsolutions.com/>

RE: RESCHEDULED - Discuss BP Appendix B Emission Calculations, if needed

VandenMeiracker, Robert <RVandenMeiracker@trcsolutions.com>

Wed 6/4/2014 11:21 AM

PSD

To:Robinson, James C. <robinsjc@dhec.sc.gov>;

Can we try for 12:00, today? We will wrap up no later than 2:30.

Robert vandenMeiracker
Project Manager

rvandenmeiracker@trcsolutions.com
30 Patewood Drive, Suite 300, Greenville, SC 29615
T: 864.234.9177 | F: 864.281.0288 | C: 864.787.5261
LinkedIn | Twitter | Blog | Flickr | www.trcsolutions.com

From: Robinson, James C. [mailto:robinsjc@dhec.sc.gov]
Sent: Wednesday, June 04, 2014 11:19 AM
To: VandenMeiracker, Robert
Subject: Re: RESCHEDULED - Discuss BP Appendix B Emission Calculations, if needed

Sorry Rob, I just realized the day and time and I will be out Wed. morning. If we need to do the call, I'm available between 12 and 2:30 on Wednesday (6/4) and between 12 and 2 on Thursday (6/5).

James C. Robinson, P.E.
Environmental Engineer
BAQ/Engineering Services Division
2600 Bull St., Columbia, SC 29201
Ph: 803-898-0660 Fax: 803-898-4079

On Tue, Jun 3, 2014 at 2:03 PM, VandenMeiracker, Robert <RVandenMeiracker@trcsolutions.com> wrote:

> Please resend.
>
> Sent using OWA for iPad

From: Robinson, James C. <robinsjc@dhec.sc.gov>
Sent: Tuesday, June 3, 2014 1:21:50 PM
To: Doerner, Michael
Cc: VandenMeiracker, Robert; Riley, Mike; Pace, Brent A; Bailey, William

Subject: Re: RESCHEDULED - Discuss BP Appendix B Emission Calculations, if needed

Ok, I think we need to a call so I can better explain what I'm looking for. Rob, do you still have my available times?

James C. Robinson, P.E.
Environmental Engineer
BAQ/Engineering Services Division
2600 Bull St., Columbia, SC 29201
Ph: 803-898-0660 Fax: 803-898-4079

On Tue, Jun 3, 2014 at 12:54 PM, Doerner, Michael <MDoerner@trcsolutions.com> wrote:

James;
Attached is table B-2 (#1 OX) showing the calculation for VOC for PTE and the year 2010.

Michael A. Doerner
Air Quality Specialist

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LinkedIn | Twitter | Blog | Flickr | www.trcsolutions.com

From: Robinson, James C. [mailto:robinsjc@dhec.sc.gov]
Sent: Tuesday, June 03, 2014 12:11 PM

To: VandenMeiracker, Robert
Cc: Riley, Mike; Doerner, Michael; Pace, Brent A; Bailey, William
Subject: Re: RESCHEDULED - Discuss BP Appendix B Emission Calculations, if needed

Ok, this is one more suggestion before a call. Please send me a sample calculation sheet(s) of one pollutant for one unit showing each step to get emissions for Tables B-1 through B-10.

James C. Robinson, P.E.
Environmental Engineer
BAQ/Engineering Services Division
2600 Bull St., Columbia, SC 29201
Ph: 803-898-0660 Fax: 803-898-4079

On Mon, Jun 2, 2014 at 1:07 PM, VandenMeiracker, Robert <RVandenMeiracker@trcsolutions.com> wrote:

> OK. Let me know tomorrow if we need to have a call and I will set up a meeting as necessary.
>
> Robert vandenMeiracker
> Project Manager
>
> rvandenmeiracker@trcsolutions.com
> 30 Patewood Drive, Suite 300, Greenville, SC 29615
> T: 864.234.9177 | F: 864.281.0288 | C: 864.787.5261
> LinkedIn | Twitter | Blog | Flickr | www.trcsolutions.com
>
> **From:** Robinson, James C. [mailto:robinsjc@dhec.sc.gov]
> **Sent:** Monday, June 02, 2014 12:30 PM
> **To:** VandenMeiracker, Robert
> **Cc:** Riley, Mike; Doerner, Michael; Pace, Brent A; Bailey, William
> **Subject:** Re: RESCHEDULED - Discuss BP Appendix B Emission Calculations, if needed
>
> Sorry Rob, I just realized the day and time and I will be out Wed. morning. If we need to do the call, I'm available between 11 and 3 on Wednesday and between 12 and 2 on Thursday.
>
> ---
> James C. Robinson, P.E.
> Environmental Engineer
> BAQ/Engineering Services Division
> 2600 Bull St., Columbia, SC 29201
> Ph: 803-898-0660 Fax: 803-898-4079
>
> On Mon, Jun 2, 2014 at 12:16 PM, VandenMeiracker, Robert <RVandenMeiracker@trcsolutions.com> wrote:
>
> > Can we reschedule for Wednesday morning. We have a conflict that will make Tuesday unworkable.

Use the link below for the web meeting and use the following conference call # to join the audio conference.

---------- Audio Conference ----------
USA Toll-Free: 888-330-1716; Access Code 8677988

USA Caller Paid/International Toll: 713-353-7024

.....

→ Join Lync Meeting

Help

All Lync meetings optionally include audio and video. If you are planning to use these functions, please make sure to have your microphone and speakers set up prior to the meeting. Attendees may also join Lync meetings via an iPhone, iPad, or Android mobile device with the Lync app.

.....

Table B-2
CR #1 OX PSD Analysis

PTE

EMISSION EQUIPMENT DESCRIPTION	EQUIPMENT ID NUMBER	MAXIMUM FIRE RATE (HP)	POLLUTANT EMITTED	POLLUTANT EMISSION FACTOR	UNITS	EMISSION FACTOR REFERENCE	HOURLY EMISSIONS (lb/hr)	PERMITTED OPERATING (hpy)	ANNUAL EMISSIONS (tpy)	COMMENTS
Emergency Generator #2	BM-1201	335	VOC	0.002514	lb/hp-hr	AP-42 3.3 (10/96)	0.842	100	0.04	Diesel Fuel Sulfur = 0.05%,
EMISSION EQUIPMENT DESCRIPTION	**EQUIPMENT ID NUMBER**	**MAXIMUM RATE (lb/hr)**	**POLLUTANT EMITTED**	**POLLUTANT EMISSION FACTOR**	**UNITS**	**EMISSION FACTOR REFERENCE**	**HOURLY EMISSIONS (lb/hr)**	**PERMITTED OPERATING (hpy)**	**ANNUAL EMISSIONS (tpy)**	**COMMENTS**
HPVGTS	HPVGTS-1	234	VOC	98.0	% Removal	BP Calcs/BACT Limit	4.7	8,760	20.5	Maximum rate based on BP design calculations & Requested BACT Limit
		1758	CO	95.0	% Removal		87.9	8,760	385.0	
		9520.6	CO_2e	0	% Removal	BP calc/USEPA EF	9,520.6	8,760	41,700	
Low Pressure Absorber	BT-603	9.6	VOC			BP Calcs/BACT Limit	9.6	8,760	42.0	Maximum rate based on BP design calculations & Requested BACT Limits
		4.1	CO				4.1	8,760	18.0	
		283.0	CO_2e			BP calc/USEPA EF	283.0	8,760	1240	
CRU Extraction Drum	BD-625	CRU removed	VOC							CRU is being removed
CRU Surge Drum	BD-631		VOC							
CRU Waste Slurry Drum	BD-632		VOC							
Silo Scrubber	BT-501	75	PM	98	% Removal	Average of data from 2/03 & 11/02 source tests	1.50	8,760	6.6	Maximum rate based on hourly emissions and % removal
			PM_{10}	98	% Removal		1.50	8,760	6.6	
			$PM_{2.5}$	98	% Removal		1.50	8,760	6.6	
CRU Evaporator Overhd Condenser	BE-645	CRU removed	VOC							CRU being removed
DHT Ovhd Scrubber	BT-702	Vent Removed	VOC							Vent Removed
			CO							
			CO_2e							
Process Fugitives			VOC			USEPA LDAR EF	21.5	8,760	94.4	

2010 Actuals

EMISSION EQUIPMENT DESCRIPTION	EQUIPMENT ID NUMBER	MAXIMUM FIRE RATE (HP)	POLLUTANT EMITTED	POLLUTANT EMISSION FACTOR	UNITS	EMISSION FACTOR REFERENCE	HOURLY EMISSIONS (lb/hr)	ACTUAL OPERATING (hpy)	ANNUAL EMISSIONS (tpy)	COMMENTS
Emergency Generator #2	BM-1201	335	NOx	0.031	lb/hp-hr	AP-42 3.3 (10/96)	10.385	33	0.2	Diesel Fuel Sulfur = 0.05%
			VOC	0.00251	lb/hp-hr	AP-42 3.3 (10/96)	0.842	33	0.01	
			CO	0.00668	lb/hp-hr	AP-42 3.3 (10/96)	2.238	33	0.04	
			SO_2	0.00205	lb/hp-hr	AP-42 3.3 (10/96)	0.687	33	0.01	
			PM	0.0022	lb/hp-hr	AP-42 3.3 (10/96)	0.737	33	0.01	
			PM_{10}	0.0022	lb/hp-hr	AP-42 3.3 (10/96)	0.737	33	0.01	
			$PM_{2.5}$	0.0022	lb/hp-hr	AP-42 3.3 (10/96)	0.737	33	0.01	
			CO_2e	163.6	lb/MMBtu	USEPA Data	137.634	33	2.3	
EMISSION EQUIPMENT DESCRIPTION	**EQUIPMENT ID NUMBER**	**MAXIMUM RATE (lb/hr)**	**POLLUTANT EMITTED**	**POLLUTANT EMISSION FACTOR**	**UNITS**	**EMISSION FACTOR REFERENCE**	**HOURLY EMISSIONS (lb/hr)**	**ACTUAL OPERATING (hpy)**	**ANNUAL EMISSIONS (tpy)**	**COMMENTS**
HPVGTS	HPVGTS-1		VOC			Emission Inventory	3	8,291	13.5	
			CO				77	8,291	319.8	
			CO_2e			BP calcs/EPA EF	9504	8,291	39,398.4	
Low Pressure Absorber	BT-603		VOC			Emission Inventory	5	8,291	22.0	
			CO				1	8,291	3.9	
			CO_2e			BP calcs/EPA EF	110	8,291	457.2	
CRU Extraction Drum	BD-625		VOC			Emission Inventory	1.0	8,291	4.1	
CRU Surge Drum	BD-631		VOC			Emission Inventory	4.0	8,291	16.6	
CRU Waste Slurry Drum	BD-632		VOC			Emission Inventory	0.003	8,291	0.01	
Silo Scrubber	BT-501		PM	98	% Removal	Average of data from 12/14/04 source test	0.84	8,291	3.5	
			PM_{10}	98	% Removal		0.84	8,291	3.5	
			$PM_{2.5}$	98	% Removal		0.84	8,291	3.5	
CRU Evaporator Overhd Condenser	BE-645		VOC			Emission Inventory	0.3	8,291	1.2	
DHT Ovhd Scrubber	BT-702		VOC			Emission Inventory	20.6	62	0.6	Based on hours vent open
			CO				76.5	62	2.4	
			CO_2e			BP calcs/EPA EF	534.1	62	16.6	
Process Fugitives			VOC			USEPA LDAR EF	19.8	8,291	82.1	

Table B-2
CR #1 OX PSD Analysis

2011 Actuals

EMISSION EQUIPMENT DESCRIPTION	EQUIPMENT ID NUMBER	MAXIMUM FIRE RATE (HP)	POLLUTANT EMITTED	POLLUTANT EMISSION FACTOR	UNITS	EMISSION FACTOR REFERENCE	HOURLY EMISSIONS (lb/hr)	ACTUAL OPERATING (hpy)	ANNUAL EMISSIONS (tpy)	COMMENTS
Emergency Generator #2	BM-1201	335	NOx	0.031	lb/hp-hr	AP-42 3.3 (10/96)	10.385	44	0.2	Diesel Fuel Sulfur = 0.05%
			VOC	0.00251	lb/hp-hr	AP-42 3.3 (10/96)	0.842	44	0.02	
			CO	0.00668	lb/hp-hr	AP-42 3.3 (10/96)	2.238	44	0.05	
			SO_2	0.00205	lb/hp-hr	AP-42 3.3 (10/96)	0.687	44	0.02	
			PM	0.0022	lb/hp-hr	AP-42 3.3 (10/96)	0.737	44	0.02	
			PM_{10}	0.0022	lb/hp-hr	AP-42 3.3 (10/96)	0.737	44	0.02	
			$PM_{2.5}$	0.0022	lb/hp-hr	AP-42 3.3 (10/96)	0.737	44	0.02	
			CO_2e	163.6	lb/MMBtu	USEPA Data	137.634	44	3.0	

EMISSION EQUIPMENT DESCRIPTION	EQUIPMENT ID NUMBER	MAXIMUM RATE (lb/hr)	POLLUTANT EMITTED	POLLUTANT EMISSION FACTOR	UNITS	EMISSION FACTOR REFERENCE	HOURLY EMISSIONS (lb/hr)	ACTUAL OPERATING (hpy)	ANNUAL EMISSIONS (tpy)	COMMENTS
HPVGTS	HPVGTS-1		VOC			Emission Inventory	3	7,608	10.3	
			CO				58	7,608	219.9	
			CO_2e			BP calcs/EPA EF	9800	7,608	37,278.5	
Low Pressure Absorber	BT-603		VOC			Emission Inventory	1	7,608	3.0	
			CO				1	7,608	2.7	
			CO_2e			BP calcs/EPA EF	117	7,608	446.5	
CRU Extraction Drum	BD-625		VOC			Emission Inventory	1.0	7,608	3.8	
CRU Surge Drum	BD-631		VOC			Emission Inventory	4.0	7,608	15.2	
CRU Waste Slurry Drum	BD-632		VOC			Emission Inventory	0.003	7,608	0.01	
Silo Scrubber	BT-501		PM	98	% Removal	Average of data from 12/14/04 source test	0.84	7,608	3.2	
			PM_{10}	98	% Removal		0.84	7,608	3.2	
			$PM_{2.5}$	98	% Removal		0.84	7,608	3.2	
CRU Evaporator Overhd Condenser	BE-645		VOC			Emission Inventory	0.3	7,608	1.1	
DHT Ovhd Scrubber	BT-702		VOC			Emission Inventory	14.5	59	0.4	Based on hours vent open
			CO				54.7	59	1.6	
			CO_2e			BP calcs/EPA EF	379.5	59	11.2	
Process Fugitives			VOC			USEPA LDAR EF	19.8	7,608	75.4	

TOTAL EMISSIONS - #1 OX PTE (tpy)

POLLUTANT	PROCESS SOURCES	COMBUSTION SOURCES	FUGITIVE SOURCES	TOTALS
NOx	0	0.5	N/A	0.5
VOC	62.5	0.04	94.4	157.0
CO	403.0	0.1	N/A	403.1
SO_2	0	0.03	N/A	0.03
PM	6.6	0.04	N/A	6.6
PM_{10}	6.6	0.04	N/A	6.6
$PM_{2.5}$	6.6	0.04	N/A	6.6
CO_2e	42,939.8	6.9	N/A	42,946.7

TOTAL EMISSIONS - #1 OX BASELINE ACTUAL (tpy)

POLLUTANT	PROCESS SOURCES	COMBUSTION SOURCES	FUGITIVE SOURCES	TOTALS
NOx	0	0.2	N/A	0.2
VOC	46.0	0.02	78.7	124.7
CO	275.1	0.04	N/A	275.1
SO_2	0	0.01	N/A	0.01
PM	3.3	0.01	N/A	3.3
PM_{10}	3.3	0.01	N/A	3.3
$PM_{2.5}$	3.3	0.01	N/A	3.4
CO_2e	38,804.2	2.6	N/A	38,806.8

POLLUTANT	THRESHOLD	DELTA (PTE - ACTUAL)
NOx	40	**0.3**
VOC	40	**32.2**
CO	100	**128.0**
SO_2	40	**0.02**
PM	25	**3.3**
PM_{10}	15	**3.3**
$PM_{2.5}$	10	**3.3**
CO_2e	75,000	**4,139.9**

Table B-2
CR #1 OX PSD Analysis

	HP Rating	AP-42 EF	Hourly Emissions		Permitted Hours	Annual Emissions	
Emergency Generator #2	335	0.00251	HP x EF	0.842	100	Hourly x hours/2000	0.04
	Max rate	% Removal					
HPVGTS	234	98.0	max rate x (100-% Removal)/100	4.7	8760	Hourly x hours/2000	20.5
Low Pressure Absorber	9.6	0		9.6	8760	Hourly x hours/2001	42.0
Fugitives	----	----	Annual * 2000/ Hours	21.5	8760	Fugitives Sheet AB47+48	94.4
						Total PTE VOC	157.0

	HP Rating	AP-42 EF	Hourly Emissions		Actual Hours	Annual Emissions	
Emergency Generator #2	335	0.00251	HP x EF	0.842	33	Hourly x hours/2000	0.01
HPVGTS	----	----	Emission Inventory lbs/hours	3	8291	Hourly x hours/2000	13.5
Low Pressure Absorber	----	----	Emission Inventory	5	8291	Hourly x hours/2000	22.0
Fugitives			(Fugitives Sheet AB33+34)*2000/hours	19.8	8291	Hourly x hours/2000	82.1
						Total 2010 Actual VOC	117.5

Fugitive Sheet above is Table B-7

RE: Items needing additional BACT analysis

Pace, Brent A <Brent.Pace@bp.com>

Wed 6/4/2014 2:21 PM

PSD

To:Robinson, James C. <robinsjc@dhec.sc.gov>;

Then the answer is yes. I believe it includes all changes.

Brent A. Pace, P.E.
Environmental Engineer / OMS Coordinator
brent.pace@bp.com
Office (843) 881 – 5182
Mobile (419) 303 - 3987

From: Robinson, James C. [mailto:robinsjc@dhec.sc.gov]
Sent: Wednesday, June 04, 2014 2:19 PM
To: Pace, Brent A
Subject: RE: Items needing additional BACT analysis

Ok, I was referring to that table (Table 2.4.1) when I said SM limits table.

From: Pace, Brent A <Brent.Pace@bp.com>
Sent: Wednesday, June 4, 2014 2:16 PM
To: Robinson, James C.
Subject: RE: Items needing additional BACT analysis

Yes. The latest Appendix B includes those changes. We need to update the BACT analysis in Section 4.

Brent A. Pace, P.E.
Environmental Engineer / OMS Coordinator
brent.pace@bp.com
Office (843) 881 – 5182
Mobile (419) 303 - 3987

From: Robinson, James C. [mailto:robinsjc@dhec.sc.gov]
Sent: Wednesday, June 04, 2014 2:13 PM
To: Pace, Brent A
Subject: RE: Items needing additional BACT analysis

Ok, so that latest SM removal table includes the changes already?

From: Pace, Brent A <Brent.Pace@bp.com>
Sent: Wednesday, June 4, 2014 2:05 PM
To: Robinson, James C.
Subject: RE: Items needing additional BACT analysis

We are adding CO to the Crystallizers Vent Scrubbers (CM301 and DM601). We have also increased the VOCs from both of those sources.

Brent A. Pace, P.E.
Environmental Engineer / OMS Coordinator
brent.pace@bp.com
Office (843) 881 – 5182
Mobile (419) 303 - 3987

From: Robinson, James C. [mailto:robinsjc@dhec.sc.gov]
Sent: Wednesday, June 04, 2014 1:44 PM
To: Pace, Brent A
Subject: Items needing additional BACT analysis

Hey Brent, thanks again for the call, it was a good call, in my opinion as well. What are the additional that are needed in the BACT analysis again? I forgot that quickly.

FW: BP CR PSD - Appendix B

Pace, Brent A <Brent.Pace@bp.com>

Mon 6/9/2014 3:31 PM

PSD

To:Robinson, James C. <robinsjc@dhec.sc.gov>;

1 attachment

Appendix B Tables-Rev.xlsx;

James

Here is the updated Appendix B with Comments as we discussed.

Brent A. Pace, P.E.
Environmental Engineer / OMS Coordinator
brent.pace@bp.com
Office (843) 881 – 5182
Mobile (419) 303 - 3987

From: Doerner, Michael [mailto:MDoerner@trcsolutions.com]
Sent: Monday, June 09, 2014 2:55 PM
To: Pace, Brent A
Cc: VandenMeiracker, Robert; Riley, Mike; Bailey, William
Subject: BP CR PSD - Appendix B

Brent;

Ready to send to James.

Michael A. Doerner
Air Quality Specialist

MDoerner@trcsolutions.com
30 Patewood Dr., Greenville, SC 29615
T: 864.234.9481 | F: 864.281.0288 | C: 864.884.2683

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FW: PSD BACT Limits

Pace, Brent A <Brent.Pace@bp.com>

Wed 6/11/2014 3:03 PM

PSD

To:Robinson, James C. <robinsjc@dhec.sc.gov>;

1 attachment

BACT Limits.pdf;

Take a look at this.

Brent A. Pace, P.E.
Environmental Engineer / OMS Coordinator
brent.pace@bp.com
Office (843) 881 – 5182
Mobile (419) 303 - 3987

From: Doerner, Michael [mailto:MDoerner@trcsolutions.com]
Sent: Monday, June 09, 2014 1:44 PM
To: Pace, Brent A
Cc: VandenMeiracker, Robert; Riley, Mike
Subject: PSD BACT Limits

Brent;

The attached pdf shows some recent SC DHEC permits that had tpy BACT limits in them. They might be rolling 12 month tpy but they are tpy. The table 5.1 is from the application for the New South Companies application. The other are marked so you can tell but these are all from applications that James said we should look at for BACT analysis.

The following is from the AGY Aiken, LLC- Aiken, South Carolina permit application. The requested tpy VOC permit limit is in their permit.

2.5 Proposed BACT Limits and Control Option

Similar sources to the binder application area and curing ovens at AGY are not equipped with control equipment. Additionally, installation and operation of add on control equipment is not cost effective. Research indicates that add on control technologies for other sources producing glass fiber who have undergone a PSD review have concluded the control technology not cost effective. AGY proposes to monitor binder usage and VOC content to limit hourly (26 pounds per hour) and **annual emissions (111 tons per year)** as the emissions limitation established under this BACT determination.

He have found other examples but sent these since they are all from SC.

Michael A. Doerner
Air Quality Specialist

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Table 5.1 Summary of Recent RACT/BACT/LAER Determinations

Permit Date	Facility	Source	BACT Limit	BACT Requirement	Compliance Verified
03/02/2012 **(application)**	Klausner Holding USA, Inc. Orangeburg, SC	(60) Batch Kilns 700 MMbd-ft/yr Hot water-heated units	3.73 lb VOC/10^3 bd-ft (as carbon) **Proposed**	Proper design and operation	No
12/15/2011	West Frasier, Inc. Bowie County, TX	(2) Continuous Kilns 275 MMbd-ft/yr Direct-fired units	3.5 lb VOC/10^3 bd-ft	Proper temperature and process management	No
11/16/2011 **(application)**	Simpson Lumber Co., LLC Georgetown, SC	(1) Batch Kiln 54.7 MMbd-ft/yr Direct-fired	3.2 lb VOC/10^3 bd-ft **Proposed**	Proper maintenance and operation	No
08/16/2011	West Frasier Timber Co., Ltd. Winn County, LA	Convert (3) Batch Kilns to Continuous Kilns 300 MMbd-ft/yr Steam-heated units	6.20 lb VOC/10^3 bd-ft (as VOC)	Proper design and operation	No
08/12/2011	Temple Inland Pineland Manufacturing Complex Sabine County, TX	Replace Studmill Dry Kiln No. 1 156 10^3 bd-ft/charge Direct-fired units	2.49 lb VOC/10^3 bd-ft	Good operating practices and management	No
05/17/2011 **Std. 5.1 BACT PSD-Avoidance**	Georgia Pacific Wood Products McCormick, SC	Convert (1) Batch Kiln to Continuous Kiln 94.538 MMbd-ft/yr Direct-fired	<250 TPY VOC (4.87 lb VOC/10^3 bd-ft basis in application)	Work practice standards and maintenance plan	No (Initial source test required, but data not yet public)
08/04/2009	North Florida Lumber – Bristol Saw Mill Liberty County, FL	Modify existing kilns 92 MMbd-ft/yr Steam-heated units	116.93 TPY VOC facility-wide increase (no specific kiln emission rate is stated)	Best operating practices	No
08/25/2008	Bibler Brothers Lumber Co. Pope County, AR	(2) Continuous Kilns 12.1 10^3 bd-ft /hr, each Direct-fired units	3.8 lb VOC/10^3 bd-ft	No controls	No
04/09/2008	Bowater Albertville Sawmill Marshall County, AL	(2) Existing Kilns, each 182.14 10^3 bd-ft/charge Steam-heated units	7.0 lb VOC/10^3 bd-ft (as pinene)	Good operating practices, operate with wet bulb set point drying schedule of ≤185 F, follow O&M procedures	No

D H E C

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment.

OFFICE OF ENVIRONMENTAL QUALITY CONTROL
BUREAU OF AIR QUALITY
PSD AND NESHAP (40 CFR 63) CONSTRUCTION PERMIT

AGY, LLC
2556 Wagener Road
Aiken, SC 29801

Permission is hereby granted to install a Material Handling System (Unit ID 01, Equipment ID 1293) and Paramelt System (Unit ID 03, Equipment ID 1294) in the existing C-Wing building. The Material Handling System will include rail and truck unloading equipment and silos for storing raw materials for the Paramelt System. The silo system includes hi-efficiency dust filters integral to the material transfer process. The Paramelt System includes a series of electrically heated furnaces for melting glass to form fiberglass fibers. The Material Handling and Paramelt Systems will have the capacity to produce a total of 2,700 pounds per hour of fiberglass strands.

The Paramelt process will be subject to SC Regulation 61-62.5, Standard No. 2 *Ambient Air Quality Standards*, Standard No. 4 *Emissions from Process Industries*, Standard No. 5.1 *BACT (Best Available Control Technology)/LAER (Lowest Achievable Emission Rate) Applicable to Volatile Organic Compounds*, Standard No. 7 *Prevention of Significant Deterioration (PSD)*, and Standard No. 8 *Toxic Air Pollutants*; SC Regulation 61-62.7 *Good Engineering Practice Stack Height*; SC Regulation 61-62.63 *National Emission Standards for Hazardous Air Pollutants (NESHAP) for Source Categories*, Subpart A *General Provisions* and Subpart B *Requirements for Control Technology Determinations for Major Sources in Accordance With Clean Air Act Sections, Section 112(g)*; SC Regulation 61-62.70 *Title V Operating Permit Program*; 40 CFR 52 *Approval And Promulgation Of Implementation Plans, Section 52.21 Prevention Of Significant Deterioration Of Air Quality*; and 40 CFR 63 *National Emissions Standards for Hazardous Air Pollutants (NESHAP) for Affected Source Categories*, Subpart A *General Provisions* and Subpart B *Requirements For Control Technology Determinations For Major Sources In Accordance With Clean Air Act Sections, Section 112(g)*.

NOTWITHSTANDING ANY OF THE CONDITIONS LISTED BELOW, NO APPLICABLE LAW, REGULATION, OR STANDARD WILL BE CONTRAVENED.

CONDITIONS

1. All official correspondence, plans, permit application forms, and written statements are an integral part of this permit.

PERMIT NUMBER: 0080-0117-CD
DATE OF ISSUE: January 19, 2010
FACILITY SIC/NAICS CODES: 3229/327212

2. The owner/operator shall submit written notification to the Director of the Engineering Services Division of the date construction is commenced, postmarked no later than 30 days after such date, and written notification of the actual date of initial startup of each new or altered source, postmarked within 15 days after such date.

3. Approval to construct shall become invalid if construction is not commenced within 18 months after receipt of such approval, if construction is discontinued for a period of 18 months or more, or if construction is not completed within a reasonable time frame. The Department may extend the 18-month period upon a satisfactory showing that an extension is justified. This request must be made prior to the permit expiration.

4. The owner or operator shall comply with all terms, conditions, and limitations of this permit.

This is pursuant to the provisions of Section 48-1-110, 1976 *Code of Laws of South Carolina*, as amended, and the *South Carolina Air Quality Control Regulation 61-62.1*, Section II and the *Code of Federal Regulations*, Title 40, Part 63 (Subpart A).

I. STANDARD CONDITIONS

A. This permit expressly incorporates all the provisions of *South Carolina Department of Health and Environmental Control Regulation 61-62.1*, Section II, Paragraph J and the *Code of Federal Regulations*, Title 40, Part 63 (Subpart A).

II. SPECIAL CONDITIONS

A. EMISSION LIMITATIONS

Air pollutant emissions shall not exceed the following:

Unit ID	Equip ID	Pollutant/ Standard	Limit	Reference Method	Regulation	State Only
01	1293	PM	5.01 lb/hr	5	SC Regulation 61-62.5, Standard No. 4, Section VIII(B)	No
01	1293	PM_{10}	5.01 lb/hr	5	SC Regulation 61-62.5, Standard No. 4, Section VIII(B)	No
01	1293	Opacity	20%	9	SC Regulation 61-62.5, Standard No. 4, Section IX(B)	No
03	1294	VOC	26 lb/hr and 111 TPY *	**	SC Regulation 61-62.5, Standard No. 7	No
03	1294	HAP (total)	87.13 TPY *	**	SC Regulation 61-62.63, Subparts A and B 40 CFR 63, Subparts A and B	No

N/A = Not Applicable
* 12-month rolling sum
** As Approved by the Department

<table>
<tr><th>Condition Number</th><th>Conditions</th></tr>
<tr><td>11.</td><td>(ID 1293) A schedule shall be implemented for regular inspection and cleaning or replacement of the process dust filters. Records of these events shall be entered in a permanent media and maintained on site.</td></tr>
<tr><td>12.</td><td>In accordance with SC Regulation 61-62.5, Standard No. 4 - Emissions from Process Industries, Section VIII - Other Manufacturing, particulate matter emissions shall be limited to the rate specified by use of the following equations: for process weight rates less than or equal to 30 tons per hour ($E = 4.10P^{0.67}$) and for process weight rates greater than 30 tons per hour ($E = 55.0P^{0.11} - 40$) where E = the allowable emission rate in pounds per hour and P = process weight rate in tons per hour.
<table>
<tr><th>Equip ID</th><th>Opacity (%)</th><th>Allowable PM Emission Limit (lb/hr)</th><th>Process Weight Rate (ton/hr)</th></tr>
<tr><td>1293</td><td>20%</td><td>5.01</td><td>1.35</td></tr>
<tr><td>1294</td><td>20%</td><td>5.01</td><td>1.35</td></tr>
</table>
The Paramelt System (ID 1294) is not expected to generate PM emissions.</td></tr>
<tr><td colspan="2">BACT Determination for VOCs – Paramelt Process</td></tr>
<tr><td>13.</td><td>The Paramelt process is permitted for a maximum production rate of 2,700 lb/hr. The owner/operator shall record the production rates to confirm that the rates do not exceed 2,700 lb/hr. These records shall be submitted to the Department semiannually.</td></tr>
<tr><td>14.</td><td>These sources are subject to all provisions of SC Regulation 61-62.5, Standard No. 7 Prevention of Significant Deterioration for Volatile Organic Compounds (VOCs).</td></tr>
<tr><td>15.</td><td>Pursuant to SC Regulation 61-62.5, Standard No. 5.1 BACT determination and Standard No. 7, the owner/operator will limit hourly VOC emissions to 26 lb/hr total and annual VOC emissions to 111 ton/yr total.</td></tr>
<tr><td>16.</td><td>The owner/operator will limit VOC emissions by using any combination of binders that do not exceed the VOC weight percents of binder 463 (1.81%) and binder 933 (5.31%). The owner/operator is not limited to the use of binders 463 and 933 only.</td></tr>
<tr><td>17.</td><td>The owner/operator will record VOC emissions from the Paramelt process to confirm that emissions do not exceed 26 lb/hr and 111 TPY. The owner/operator will record the type of binder, VOC content in each binder, and quantity of each binder used, at a minimum.</td></tr>
<tr><td>18.</td><td>The owner/operator will calculate VOC emissions on a monthly basis and a twelve-month rolling sum shall be calculated for total VOC emissions. Reports of the calculated values and the twelve-month rolling sum shall be submitted to the Department semiannually. These reports shall confirm that VOC emissions do not exceed 26 lb/hr and 111 TPY.</td></tr>
<tr><td>19.</td><td>An algorithm, including example calculations and emission factors, explaining the method used to determine emission rates shall be included in the initial report. Subsequent submittals of the algorithm and example calculations are unnecessary, unless the method of calculation is found to be unacceptable by the Department or if the facility changes the method of calculating emissions and/or changes emission factors.</td></tr>
<tr><td colspan="2">112(g) Determination for HAPs</td></tr>
<tr><td colspan="2">General Requirements</td></tr>
<tr><td>20.</td><td>The owner/operator shall comply with 40 CFR 63 National Emission Standards for Hazardous Air Pollutants (NESHAP) for Source Categories, Subparts A (General Provisions) and B (Requirements for Control Technology Determinations for Major Sources in accordance with Clean Air Act, Section 112(g) and SC Regulation 61-62.63, Subparts A and B, as applicable.</td></tr>
<tr><td>21.</td><td>All provisions contained in this NOMA shall be federally enforceable upon the effective date of issuance of such notice, as provided by SC Regulations 61-63.43(j) and 63.43(g)(3).</td></tr>
<tr><td>22.</td><td>This NOMA applies to the proposed Paramelt System for a maximum production rate of 2,700 lb/hr to be located at AGY, LLC, 2556 Wagener Road, Aiken, SC 29801.</td></tr>
<tr><td>23.</td><td>All official correspondence, plans, application forms, and written statements are an integral part of this NOMA.</td></tr>
</table>

RE: Synthetic Minor Limit Discussion

Robinson, James C.

Wed 6/11/2014 1:55 PM

PSD

To:Robinson, James C. <robinsjc@dhec.sc.gov>;

Brent, I'm going to call you around 2:30.

James C. Robinson, P.E.
Environmental Engineer
BAQ/Engineering Services Division
2600 Bull St., Columbia, SC 29201
Ph: 803-898-0660 Fax: 803-898-4079

From: Robinson, James C.
Sent: Tuesday, June 10, 2014 11:55 AM
To: brent.pace@bp.com
Subject: RE: Synthetic Minor Limit Discussion

Yes, that's the plan. Hopefully nothing comes up.

James C. Robinson, P.E.
Environmental Engineer
BAQ/Engineering Services Division
2600 Bull St., Columbia, SC 29201
Ph: 803-898-0660 Fax: 803-898-4079

From: Pace, Brent A <Brent.Pace@bp.com>
Sent: Tuesday, June 10, 2014 11:50 AM
To: Robinson, James C.
Subject: Re: Synthetic Minor Limit Discussion

Sounds good. Let's chat tomorrow?

Brent Pace

On Jun 10, 2014, at 11:44 AM, "Robinson, James C." <robinsjc@dhec.sc.gov> wrote:

> Hey Brent, if you haven't seen it or know yet, I won't be back in the office until tomorrow (Wednesday 6/11).
>
> James C. Robinson, P.E.
> Environmental Engineer
> BAQ/Engineering Services Division
> 2600 Bull St., Columbia, SC 29201
> Ph: 803-898-0660 Fax: 803-898-4079
>
> ---
>
> **From:** Pace, Brent A <Brent.Pace@bp.com>
> **Sent:** Monday, June 9, 2014 9:59 AM
> **To:** Robinson, James C.
> **Subject:** RE: Synthetic Minor Limit Discussion

James

Do you time for a quick call this morning or afternoon. I have what are hopefully a couple of quick clarifying questions on your note below.

Brent A. Pace, P.E.
Environmental Engineer / OMS Coordinator
brent.pace@bp.com
Office (843) 881 – 5182
Mobile (419) 303 - 3987

From: Robinson, James C. [mailto:robinsjc@dhec.sc.gov]
Sent: Sunday, June 08, 2014 10:48 PM
To: Pace, Brent A
Subject: RE: Synthetic Minor Limit Discussion

Brent based on our discussion today, we are OK with the approach of pulling out units and keeping the wastewater stripper and reactor in the synthetic minor limit from construction permit CF. BP will need to clearly show in detail how you the limit came about from an emissions standpoint, and ensure that the modified SM limit is still valid.

Another thing that came out of our discussion is that PSD only uses short term limits (lb/hr) as BACT. Please remove the TPY numbers throughout the BACT analysis section and discuss only short term limits.

From: Pace, Brent A <Brent.Pace@bp.com>
Sent: Wednesday, June 4, 2014 1:31 PM
To: Robinson, James C.
Subject: Synthetic Minor Limit Discussion

James

Good call today. I think we got some good things covered.

As soon as you can resolve the synthetic minor issue, we can submit the revisions all at once. Think you can have an answer end of this week/early next week?

Brent A. Pace, P.E.
Environmental Engineer / OMS Coordinator
brent.pace@bp.com
Office (843) 881 – 5182
Mobile (419) 303 - 3987

RE: Question for you

Robinson, James C.

Fri 6/13/2014 10:08 AM

PSD

To:brent.pace@bp.com <brent.pace@bp.com>;

Hey Brent I'm in the process of tracking down some specific citations for you and typing up an email. Hopefully I'll have something to you before Noon, so we can discuss this afternoon, if needed.

James C. Robinson, P.E.
Environmental Engineer
BAQ/Engineering Services Division
2600 Bull St., Columbia, SC 29201
Ph: 803-898-0660 Fax: 803-898-4079

From: Pace, Brent A <Brent.Pace@bp.com>
Sent: Thursday, June 12, 2014 2:56 PM
To: Robinson, James C.
Subject: Question for you

James;
Could you please tell us the basis for the decision that the BACT limits must be hourly rather than a rolling twelve month sum?

This will help us formulate a plan for what we might revise.

Was there anything else in the current application that you were not going to accept? I'd rather address those now if possible.

Thanks James. I look forward to hearing back from you.

Brent Pace

BP PSD - Revision for CF Permit Condition

Pace, Brent A <Brent.Pace@bp.com>

Tue 6/17/2014 11:01 AM

PSD

To:Robinson, James C. <robinsjc@dhec.sc.gov>;

James,

I just left you a voicemail to discuss this before I sent it, but figured since I couldn't get you on the phone, I would go ahead and send it! Please call me to discuss.

Please find below the proposed table revisions for your comments that we would like to make for Permit CF. Also note that there are a couple of additional small sources that we identified as part of Permit CF that we would like to include with the anaerobic reactor and CO2 Stripper for a new permit limit of 3.79 lbs/hr (see below). In addition, we will be adding a BACT analysis for the CATOX fired heater that we identified needed this from the review of Permit CF.

The last thing is, we would like to have a conference call with you, Veronica, and Liz to discuss the short term limits that we have been talking about recently.

Talk to you soon!

Brent A. Pace, P.E.
Environmental Engineer / OMS Coordinator
brent.pace@bp.com
Office (843) 881 – 5182
Mobile (419) 303 - 3987

Below in blue is the revision for the CF PSD avoidance limit.

1.1 Prevention of Significant Deterioration Emission Limits

As a result of this application and the Best Available Control Technology (BACT) analysis included for VOC and CO emissions, the following existing PSD avoidance limits shown in Table 2.4.1 are requested to be removed and replaced by the applicable BACT/PSD limits shown in the table. The PSD analysis has included the emission impacts of the removal of these PSD avoidance limits on the resulting PTE emissions.

Table 2.4.1
Emission Limit Revisions

		PREVIOUS PSD	REQUESTED BACT/PSD	SHORT-TERM BACT/PSD

EMISSION POINT	POLLUTANT	AVOIDANCE LIMITS[1]	LIMITS (tpy)	LIMITS (lbs/hr)
#1 OX LPA	VOC	80 tpy and 40 lb/hr	42.0	12
	CO	40 tpy	18.0	5
#1 DHT Scrubber	VOC	165 tpy and 60 lb/hr	N/A – no longer vents to atmosphere	
	CO	380 tpy		
#1 HPVGTS	VOC	80 tpy and 85 lb/hr	20.5	6
	CO	375 tpy and 1,452 lb/hr	385.0	106
#1 PTA Crystallizer Vent Scrubber	VOC	None	87.6	25
	CO	None	28.5	8.0
#2 LPA	VOC	215.9 tpy and 49.3 lb/hr	38.8	11
#2 OX HPVGTS			15.3	5
#2 PTA Crystallizer Vent Scrubber			87.6	24
#2 LPA	CO	None	15.2	5
#2 OX HPVGTS			329.0	90
#2 PTA Crystallizer Vent Scrubber			28.5	8.0
Combined total for #1 OX and #2 OX, #1 PTA and #2 PTA	VOC	1,825 tpy	Replaced by individual vent limits	

(1) All these previous PSD avoidance limits are requested to be removed

The existing synthetic minor (PSD avoidance) VOC emission limit of 49.3 lbs/hr that was included in the construction permit CF for the addition of the #2 unit will be revised. The Table 2.4.2 shows the original limit basis and the basis for the requested revised VOC emission limit of 3.79 lbs/hr.

Table 2.4.2

Construction Permit CF Synthetic Minor VOC Emission Limit

Source	Permit VOC Emissions (lb/hr)	BACT Analysis of Source	PSD Avoidance VOC Emissions (lbs/hr)
No. 2 Ox Unit	15.57	Yes	N/A
No. 2 PTA	25.6	Yes	N/A
No. 2 Fugitives	3.5	Yes	N/A
Catox (Fired Heater)	0.84	Yes	N/A
Tank Farm	0.02	No	0.02

Anaerobic Rxr	0.31	No	0.31
Wastewater Fugitives (incr)	3.11	No	3.11
CO2 Stripper	0.35	No	0.35
PSD Avoidance Limit (lbs/hr)	**49.26**	**----**	**3.79**

BP will continue to abide by all of the other synthetic minor (PSD avoidance) limits in the existing Title V permit as they presently exist. This includes all limits for PM, particulate matter (nominally 10 microns or less) (PM_{10}), nitrogen oxides (NO_X), and sulfur dioxide (SO_2) in the existing Title V permit. Table 2.4.3 shows those synthetic minor limits that will remain unchanged and to which CR BP will continue to abide.

Table 2.4.3
Unchanged Synthetic Minor Emission Limits

EMISSION POINT	POLLUTANT	PSD AVOIDANCE LIMITS
#1 OX Silo Scrubber	PM_{10}	2.16 lb/hr
Silos CF-701 A-E	PM_{10}	1.08 lb/hr (each)
Silo CF-701 F	PM_{10}	0.48 lb/hr
Boilers AB-350 A/B	PM/PM_{10}	50.9 tpy combined
	SO_2	733.4 tpy combined
Boilers AB-350 A/B	NO_X	317.0 tpy combined
	CO	299.6 tpy combined

RE: BP CR PSD - Heater BACT Analysis

Robinson, James C.

Fri 6/27/2014 4:26 PM

PSD

To: brent.pace@bp.com <brent.pace@bp.com>;

Cc: Barringer, Veronica <barrinv@dhec.sc.gov>;

1 attachment

Heater BACT Analysis - jcr comments (6-27-14).docx;

Brent, here are my comments. If needed, we can discuss on call Wednesday, unless you want to discuss it before then.

James C. Robinson, P.E.
Environmental Engineer
BAQ/Engineering Services Division
2600 Bull St., Columbia, SC 29201
Ph: 803-898-0660 Fax: 803-898-4079

From: Pace, Brent A <Brent.Pace@bp.com>
Sent: Monday, June 23, 2014 4:30 PM
To: Robinson, James C.
Subject: BP CR PSD - Heater BACT Analysis

James

Here was the other item. Attached is the CATOX Heater BACT Analysis. Would you take a look at it and see if this suffices?

Brent A. Pace, P.E.
Environmental Engineer / OMS Coordinator
brent.pace@bp.com
Office (843) 881 – 5182
Mobile (419) 303 - 3987

1.1 Best Available Control Technology Analysis for Volatile Organic Compound Emissions from #2 Ox Unit HPVGTS Fired Heater

Comment: This is not following the BACT process. Some steps are left out. BP will need to closely follow the BACT 5 step process, and include all details of each process. If a step is not needed then a explanation should be given why it's not.

The fired heater in the #2 OX Unit HPVGTS preheats the feed to the HPVGTS reactor thru indirect heat exchange. The emissions from the combustion of the natural gas fuel is exhausted out the heater stack. The heater is a nominal 15 MM Btu/hr heater with a single burner that in its actual operation averages less than 3 MM Btu/hr for the year. This fired heater is subject to 40 CFR 60 Subpart DDDDD and will be required to meet the tune-up requirements of the regulation.

1.1.1 Identification of Control Technologies

The RBLC database was queried for emission sources and control devices of VOC that are used in the process type 13.31 (Natural Gas Fired Boilers/Furnaces < 100 MM Btu/hr). The results of the RBLC search are shown in Appendix C. The search returned sixty five facilities and ninety three processes for BACT in this industrial category. The following control devices were identified from the search:

- Good Combustion
- Natural Gas Fuel
- Flue Gas Recirculation (FGR)
- Tune-ups

In the RBLC, most of the BACT were either no controls or good combustion/natural gas fuel. The heater currently utilizes natural gas as the only permitted fuel and good combustion practices. This fired heater is subject to 40 CFR 60 Subpart DDDDD and will be required to meet the tunes-up requirements of the regulation.

Other resources of control technology were reviewed, such as *EPA Air Pollution Control Technology Fact Sheets*; *EPA Air Pollution Control Cost Manual Sixth Edition*, EPA/452/B-02-001, January 2002; and applicable NSPS and NESHAPs standards. The review indicated that control equipment is typically not employed to reduce VOC emissions.

1.1.2 Elimination of Infeasible Control Options

Comment: Need to include the details of the evaluation.

The four identified control options were evaluated qualitatively to determine if these options are technically feasible. The following control technologies were determined to be technically feasible for control of CO:

- Good Combustion
- Natural Gas Fuel
- Tune-ups

The FRG is not a feasible option since the existing heater is not compatible with a FGR system and would need to build a new heater to accommodate FGR. Since the only remaining BACT control options are already utilized for the heater there is no need to do any further analysis of the BACT options.

Comment: Provide all the details on why existing heater is not compatible.

Also the very low VOC emissions rate of 0.08 lb/hr (0.35 tpy at maximum firing rate for 8760 hours) would require an annualized operating cost for any new control option to be less than about $2,000 to have an ACE of less than $6,000. A comparison to recent South Carolina PSD permit application for AGY-Aiken, LLC shows that ACE values in the range of $5,760 to $9,031 were deemed not cost effective for control of VOC.

Comment: This is not in the right section.

1.1.3 Evaluation of Most Effective Control Technologies and Selection of Best Available Control Technology

Comment: There is no ranking of control options

Comment: No discussion of economic impact. Include detailed discussion of economic impact unless BP is selecting the top ranked control option(s).

The BACT analysis is a three-part investigation that includes economic, energy, and environmental impacts. Each of the remaining options was reviewed with respect to the impacts to determine if they meet BACT requirements.

Energy Analysis

An energy impact analysis is used to identify if the technically feasible control options result in any significant or unusual energy penalties or benefits. The feasible control options have been evaluated and it has been determined that they have no unusual energy. An analysis of energy benefits was also considered; the tune-up and good combustion options result in an energy benefit for the BP facility due to improved efficiency.

4.8.2.3 Environmental Analysis

A review of the control options with respect to the environment was conducted to determine if any of the options created any adverse environmental impacts. The proposed technically feasible options would have some environmental benefit due to a reduction in energy usage.

4.8.1 Selection of Best Available Control Technology

Based on the energy, environmental, and economic impacts associated with the technically feasible control options, BP has concluded that the present control options

utilized for the heater are BACT and no further controls are justified. BP proposes a BACT limit for VOC emissions from the #2 OX HPVGTS Fired Heater of 0. 0055 lb/MM Btu based on a 3 hour averaging time. This limit would be monitored by a maintaining good combustion control and performing a tune-up in accordance with the requirements of 40 CFR 63 Subpart DDDDD.

1.2 Best Available Control Technology Analysis for Carbon Monoxide Emissions from #2 Ox Unit HPVGTS Fired Heater

The fired heater in the #2 OX Unit HPVGTS preheats the feed to the HPVGTS reactor thru indirect heat exchange. The emissions from the combustion of the natural gas fuel is exhausted out the heater stack. The heater is a nominal 15 MM Btu/hr heater with a single burner that in its actual operation averages less than 3 MM Btu/hr for the year. This fired heater is subject to 40 CFR 60 Subpart DDDDD and will be required to meet the tunes-up requirements of the regulation.

1.2.1 Identification of Control Technologies

The RBLC database was queried for emission sources and control devices of CO that are used in the process type 13.31 (Natural Gas Fired Boilers/Furnaces < 100 MM Btu/hr). The results of the RBLC search are shown in Appendix C. The search returned fifty nine facilities and ninety two processes for BACT in this industrial category. The following control devices were identified from the search:

- Good Combustion
- Natural Gas Fuel
- Flue Gas Recirculation (FGR)
- Tune-ups

In the RBLC, most of the processes BACT were either no controls or good combustion/natural gas fuel. The heater currently utilizes natural gas as the only permitted fuel and good combustion practices. This fired heater is subject to 40 CFR 60 Subpart DDDDD and will be required to meet the tunes-up requirements of the regulation.

Other resources of control technology were reviewed, such as *EPA Air Pollution Control Technology Fact Sheets*; *EPA Air Pollution Control Cost Manual Sixth Edition*, EPA/452/B-02-001, January 2002; and applicable NSPS and NESHAPs standards. The review indicated that control equipment is typically not employed to reduce CO emissions.

1.2.2 Elimination of Infeasible Control Options

The four identified control options were evaluated qualitatively to determine if these options are technically feasible. The following control technologies were determined to be technically feasible for control of CO:

- Good Combustion
- Natural Gas Fuel
- Tune-ups

The FRG is not a feasible option since the existing heater is not compatible with a FGR system and would need to build a new heater to accommodate FGR. Since the only remaining control options are already utilized for the heater there is no need to do any further analysis of the BACT options.

Also the low CO emissions rate of 1.24 lb/hr (5.4 tpy at maximum firing rate for 8760 hours) would require an annualized operating cost for any new control option to be less than about $32,000 to have an ACE of less than $6,000. The ACE values are compared to Georgia PSD applications for Johns Manville-Winder and Houston American Cement which indicated that ACE values of $5,800-9,696 were not cost effective for CO control..

1.2.3 Evaluation of Most Effective Control Technologies and Selection of Best Available Control Technology

The BACT analysis is a three-part investigation that includes economic, energy, and environmental impacts. Each of the remaining options was reviewed with respect to the impacts to determine if they meet BACT requirements.

Energy Analysis

An energy impact analysis is used to identify if the technically feasible control options result in any significant or unusual energy penalties or benefits. The feasible control options have been evaluated and it has been determined that they have no unusual energy. An analysis of energy benefits was also considered; the tune-up and good combustion options result in an energy benefit for the BP facility due to improved efficiency.

4.8.2.3 Environmental Analysis

A review of the control options with respect to the environment was conducted to determine if any of the options created any adverse environmental impacts.

The proposed technically feasible options would have some environmental benefit due to a reduction in energy usage.

4.8.2 Selection of Best Available Control Technology

Based on the energy, environmental, and economic impacts associated with the technically feasible control options, BP has concluded that the present control options utilized for the heater are BACT and no further controls are justified. BP proposes a BACT limit for CO emissions from the #2 OX HPVGTS Fired Heater of 0.084 lb/MM Btu based on a three hour averaging time. This limit would be monitored by a maintaining good combustion control and performing a tune-up in accordance with the requirements of 40 CFR 63 Subpart DDDDD.

% Efficiency for the CATOX Units at BP Cooper River

Pace, Brent A <Brent.Pace@bp.com>

Mon 7/7/2014 4:47 PM

PSD

To:Robinson, James C. <robinsjc@dhec.sc.gov>;

Cc:Doerner, Michael (MDoerner@trcsolutions.com) <MDoerner@trcsolutions.com>;

James,

Please see below the discussion of the CATOX Efficiency. Please let me know if you have any questions.

CATOX Efficiencies of 95% for Carbon Monoxide (CO) and 98% for Volatile Organic Compounds (VOCs) have been used for determining the annual PTE emissions used in the PSD applicability analysis. These annual PTE emissions rates were then used in calculating the requested short term permit limits in the PSD Application for BP Cooper River. Historical testing has shown that it is difficult to measure efficiencies at these levels due to the fact that the compounds are at or below detection levels in the outlet stream (and sometimes in the inlet stream). The inlet stream loading is at a level that when compared to the outlet stream at detection levels, destruction efficiencies can appear to be below the 95% and 98% levels discussed above, even though they are most likely exceeding these levels in a positive manner. BP CR had previously demonstrated compliance with HON Group 1 emissions standards based on the allowable 20 ppm concentration rather than the alternate destruction efficiency standard of 98 % because of the outlet stream detection levels.

Therefore, BP requests that no efficiency limits be placed in the PSD Permit, but rather only include the requested emission rate (lb/hr) permit limits for CO and VOC based on the 95% and 98% destruction levels.

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ASPEN emissions description

Pace, Brent A <Brent.Pace@bp.com>

Thu 7/10/2014 3:10 PM

PSD

To:Robinson, James C. <robinsjc@dhec.sc.gov>;

James

Please see below for an explanation of the basis for using Aspen for the PTE emissions estimates.

The BP CR project PTE emissions estimates for the PSD analysis were generated using Aspen Plus®, a process simulator that uses a BP proprietary physical properties information package to calculate overall unit emissions. Aspen Plus is a process simulation software designed and owned by Aspentech that is commonly used by the chemical industry for design calculations.

The inputs to the Aspen Plus process simulator include the following:

1. The historical stack test data for the CR units
2. Heat and material balances for the existing unit configurations.
3. Current stack test data and, heat and material balance information for the BP PTA units in Decatur Alabama. Several of the Decatur units currently have the azeotropic process in operation which will be implemented in the Cooper River Project.
4. Design information for the new reactor and other proprietary changes being made to the CR facility

Each emission point was evaluated for normal post project emissions by the Aspen Plus process simulation software using a combination of historical and design data. Additional evaluations were performed for start-up and shut-down conditions. Providing all of the many inputs and outputs for the Aspen Plus process simulator is difficult, unless one is running the software.

Brent A. Pace, P.E.
Environmental Engineer / OMS Coordinator
brent.pace@bp.com
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Mobile (419) 303 - 3987

FW: Summary of 7/10/14 BP PSD call

Pace, Brent A <Brent.Pace@bp.com>

Wed 7/16/2014 3:16 PM

PSD

To:Robinson, James C. <robinsjc@dhec.sc.gov>;

Cc:Doerner, Michael (MDoerner@trcsolutions.com) <MDoerner@trcsolutions.com>;

Brent A. Pace, P.E.
Environmental Engineer / OMS Coordinator
brent.pace@bp.com
Office (843) 881 – 5182
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Answers marked below:

1. BP will provide discussion on removal of synthetic minor limits on DHT Scrubbers. **The following footnote was added to Table 2.4.1 "This limit accounts for the emissions from DHT Scrubber vent that used to go to atmosphere."**
2. BP clarified that the HPA recovers mainly acetic acid and residual paraxylene (PX). **Nothing required**
3. BP will provide BACT analysis of CATOX's being used on all VOC and CO emitting equipment. **Added existing Catox as an option for LPA BACT and Crystallizer Vent scrubber.**
4. BP will add crystallizer vent streams to process flow diagrams, showing them going to the HPAs. **Have corrected both existing & future diagrams for both #1 & #2**
5. BP will provide details of how purchase costs are calculated for technically feasible LPA and HPA control technologies. **We are working on this.**
6. BP will provide discussion of why CATOXs can't meet 99% effiency for VOC and CO reduction. **Already sent email reply. Veronica stated that this email should suffice. James and Veronica will ask questions if needed.**

Summary of 7/10/14 BP PSD call

Robinson, James C.

Tue 7/15/2014 3:35 PM

Sent Items

To: brent.pace@bp.com <brent.pace@bp.com>; Doerner, Michael <MDoerner@trcsolutions.com>;

Cc: Barringer, Veronica <barrinv@dhec.sc.gov>;

My apologies for sending this late Brent.

1. BP will provide discussion on removal of synthetic minor limits on DHT Scrubbers.
2. BP clarified that the HPA recovers mainly acetic acid and residual paraxylene (PX).
3. BP will provide BACT analysis of CATOX's being used on all VOC and CO emitting equipment.
4. BP will add crystallizer vent streams to process flow diagrams, showing them going to the HPAs.
5. BP will provide details of how purchase costs are calculated for technically feasible LPA and HPA control technologies.
6. BP will provide discussion of why CATOXs can't meet 99% effiency for VOC and CO reduction.

James C. Robinson, P.E.
Environmental Engineer
BAQ/Engineering Services Division
2600 Bull St., Columbia, SC 29201
Ph: 803-898-0660 Fax: 803-898-4079

RE: Purchase Cost Estimation (2).docx

Robinson, James C.

Wed 7/23/2014 2:03 PM

Sent Items

To: brent.pace@bp.com <brent.pace@bp.com>;

This is exactly what I'm looking for. By this example it would appear that most, if not all the cost analyses will need to be changed.

James C. Robinson, P.E.
Environmental Engineer
BAQ/Engineering Services Division
2600 Bull St., Columbia, SC 29201
Ph: 803-898-0660 Fax: 803-898-4079

From: Pace, Brent A <Brent.Pace@bp.com>
Sent: Wednesday, July 23, 2014 1:27 PM
To: Robinson, James C.
Subject: Purchase Cost Estimation (2).docx

What do you of something like this for purchase cost estimation?

Brent

Purchase Cost Estimation

The following is an example of how the purchase costs are estimated in the Appendix D BACT Cost tables.
An example of how use EPA Cost manual

The equation for the purchase cost of a thermal oxidizer per the EPA OAQPS Cost Manual is: Purchase Cost = 10294 x $Q^{0.2355}$

Where Q = Flue Gas (which includes the inlet gas plus fuel & combustion air)

This will give the cost in 1998$ which then have to be adjusted for inflation to present day cost.

For the LPA the Q = 8,500
So the 1998 Cost = 10294 x $8500^{0.2355}$ = $86,700
After accounting for inflation at 4% per year you get the 2015 cost = $168,900
Then recognize that would need to be stainless steel due to methyl bromide which is 50-55% more than carbon steel
Final Purchase cost = $255,000

The

Following is the OAQPS equation to calculate the 1998$ purchase cost:

TO = 10294 x $Q^{0.2355}$

CTO =1105 x $Q^{0.5471}$

RTO = 17052 x $Q^{0.2502}$

RCO = 17056 x $Q^{0.2502}$

Flare = $(76.4 + 2.72 D + 1.64 L)^2$

Scrubber = 115 x (pi x D (L + D/2))

Carbon Adsorber = 271 x $S^{0.778}$

Condenser = exp (9.83-0.014 *T+ 0.34 ln R)

Tricking Biofilter = F X 25

Biofilter = F x 5

Where
Q = flow rate of flue gas
D = diameter
Pi = 3.14
L = Height
Hgt = height
R = refrigeration load
S = Surface
F= Waste stream flow

Source	LPA	HPA	Crystallizer Vent Scrubber
Q (scfm)	8,500	200,000	32,000
Flare D (ft)	1	2	1
Flare L (ft)	200	170	200
Scrubber D (ft)	4	8	4
Scrubber L (ft)	33	57	30
S (sq Ft)	2 @1000 each	$ @ 1000 each	N/A
R (tons)	20	125	55
F (acfm)	13,600	22,000	52,600

RE: Topics for 7/23/14 BP PSD Call

Robinson, James C.

Wed 7/23/2014 3:13 PM

Sent Items

To: brent.pace@bp.com <brent.pace@bp.com>;

Cc: Basil, Elizabeth <basilej@dhec.sc.gov>; Barringer, Veronica <barrinv@dhec.sc.gov>;

Summary of call...

1. BP will provide explanation/description LDAR program, and will also discuss why it is technically feasible.

2. BP will provide applicability determination of 40 CFR 61 Subpart V "National Emission Standards for Equipment Leaks (Fugitive Emission Sources)".

3. BAQ is OK with 7/23/14 email BP sent showing how control device purchase costs were calculated.

4. BP will revisit CATOX catalyst replacement costs to make sure replacement time frame of 2 years is representative.

5. BP will need to add two new emergency generators and remove one emergency generator. This will be address in the BACT analysis.

James C. Robinson, P.E.
Environmental Engineer
BAQ/Engineering Services Division
2600 Bull St., Columbia, SC 29201
Ph: 803-898-0660 Fax: 803-898-4079

From: Pace, Brent A <Brent.Pace@bp.com>
Sent: Wednesday, July 23, 2014 2:29 PM
To: Robinson, James C.
Subject: RE: Topics for 7/23/14 BP PSD Call

Sounds good. Call me when you are ready. It is just you and me I think.

Brent A. Pace, P.E.
Environmental Engineer / OMS Coordinator
brent.pace@bp.com
Office (843) 881 – 5182
Mobile (419) 303 - 3987

From: Robinson, James C. [mailto:robinsjc@dhec.sc.gov]
Sent: Wednesday, July 23, 2014 2:26 PM
To: Pace, Brent A
Subject: Topics for 7/23/14 BP PSD Call

1. Provide a brief explanation/description of all potentially applicable LDAR programs.

2. Applicability of 40 CFR 61 Subpart V "National Emission Standards for Equipment Leaks (Fugitive Emission Sources)"

3. Recap of example control technology purchase cost.

4. Any updates/Other

James C. Robinson, P.E.
Environmental Engineer
BAQ/Engineering Services Division
2600 Bull St., Columbia, SC 29201
Ph: 803-898-0660 Fax: 803-898-4079

RE: BP CR PSD - Generator BACT

Robinson, James C.

Thu 8/7/2014 2:57 PM

Sent Items

To: brent.pace@bp.com <brent.pace@bp.com>; Doerner, Michael <MDoerner@trcsolutions.com>;

Cc: Barringer, Veronica <barrinv@dhec.sc.gov>; York, Karla A. <YORKKA@dhec.sc.gov>;

1 attachment

dor025cz.pd _04-13-2012_.pdf;

Brent/Mike,

Attached is the Showa Denko Preliminary BACT Determination (PD). There are a few examples of language to use for the Generators. It also may be helpful to use for the #2 Catox Heater, but I'm not sure.

James C. Robinson, P.E.
Environmental Engineer
BAQ/Engineering Services Division
2600 Bull St., Columbia, SC 29201
Ph: 803-898-0660 Fax: 803-898-4079

From: Pace, Brent A <Brent.Pace@bp.com>
Sent: Tuesday, August 5, 2014 10:55 AM
To: Robinson, James C.
Subject: Re: BP CR PSD - Generator BACT

The one that had the write up on the generators that you were hoping we could duplicate. Showadanko?

Brent Pace

On Aug 5, 2014, at 10:42 AM, "Robinson, James C." <robinsjc@dhec.sc.gov> wrote:

> Which permit are you referring to?
>
> ---
>
> James C. Robinson, P.E.
> Environmental Engineer
> BAQ/Engineering Services Division
> 2600 Bull St., Columbia, SC 29201
> Ph: 803-898-0660 Fax: 803-898-4079

From: Pace, Brent A <Brent.Pace@bp.com>
Sent: Tuesday, August 5, 2014 10:02 AM
To: Robinson, James C.
Subject: Re: BP CR PSD - Generator BACT

James

Is it possible to scan the language from the existing permit and send to us. We don't access to it unless we do a formal request. If you can send it to us or some suggestions we can get it incorporated into the permit.

We are trying to get the application out to you this week.

Brent Pace

On Aug 4, 2014, at 4:22 PM, "Robinson, James C." <robinsjc@dhec.sc.gov> wrote:

> Brent, I am not following this. I thought we discussed using language explaining emissions are insignificant compared to other VOC and CO sources. Either way, if BP chooses to use this approach, we need to go over this on the phone.
>
> ---
> James C. Robinson, P.E.
> Environmental Engineer
> BAQ/Engineering Services Division
> 2600 Bull St., Columbia, SC 29201
> Ph: 803-898-0660 Fax: 803-898-4079
>
> ---
>
> **From:** Pace, Brent A <Brent.Pace@bp.com>
> **Sent:** Friday, August 1, 2014 12:41 PM
> **To:** Robinson, James C.
> **Subject:** FW: BP CR PSD - Generator BACT
>
> James
>
> Here is what we are thinking for the Emergency Generator BACT write up. Thoughts?
>
> **Brent A. Pace, P.E.**
> Environmental Engineer / OMS Coordinator
> brent.pace@bp.com
> Office (843) 881 – 5182
> Mobile (419) 303 - 3987

Table 2 4 1 Question-Rev.xlsx

Pace, Brent A <Brent.Pace@bp.com>

Wed 8/20/2014 9:48 AM

PSD

To: Robinson, James C. <robinsjc@dhec.sc.gov>;

1 attachment

Table 2 4 1 Question-Rev.xlsx;

James

I reviewed this table and I found one mistake on the first 3 emission points. We had said it was Permit CP and it was actually Permit CR. I made the change. Hopefully this is what you need.

Brent

Emission Point	Pollutant	Previous PSD Avoidance Limits	Requested BACT/PSD Limits (TPY)	Short Term BACT/PSD Limits (Lb/hr)	Title V permit Condition	Construction Permit
#1 OX LPA	VOC	80 tpy and 40 lb/hr	42	9.6	5.E.4	0420-0029 - CR
	CO	40 tpy	18	4.1	5.E.4	0420-0029 - CR
#1 DHT Scrubber	VOC	165 tpy and 60 lb/hr	N/A – no longer vents to atmosphere		5.E.4	0420-0029 - CR
#1 HPVGTS	VOC	80 tpy and 85 lb/hr	20.5	4.7	5.E.4	0420-0029 - CR
	CO	375 tpy and 1,452 lb/hr	385	87.9	5.E.4	0420-0029 - CR
#1 PTA Crystallizer Vent Scrubber	VOC	None	87.6	20	N/A	N/A
	CO	None	28.5	24	N/A	N/A
#2 LPA	VOC	215.9 tpy and 49.3 lb/hr	38.8	8.9	5.E.31	0420-0029 - CF
#2 OX HPVGTS			15.3	3.5		
#2 PTA Crystallizer Vent Scrubber			87.6	20		
#2 OX HPVGTS Heater	VOC			0.0055 lbs/MM Btu		
#2 LPA	CO	None	15.2	3.5	N/A	N/A
#2 OX HPVGTS			329	75.1		
#2 PTA Crystallizer Vent Scrubber			28.5	20		
#2 OX HPVGTS Heater	CO	None		0.084 lbs/MM Btu	N/A	N/A
#1 & #2 OX Fugitives	VOC/HAPS	None		HON LDAR	N/A	N/A
Combined total for #1 OX and #2 OX, #1 PTA and #2 PTA	VOC	1,825 tpy	Replaced by individual vent limits		5.E.5	original - 3/1/1996 DHEC letter (Title V Application)* Revised 0420-0029 - CP

* From 2000 Title V Application "Cooper River also requests that the facility wide cap of 2468 TPY contained in the DHEC letter of November 2, 1998 be continued instead of process unit specific limits."

Answers to a couple of questions

Pace, Brent A <Brent.Pace@bp.com>

Thu 8/21/2014 11:42 AM

PSD

To:Robinson, James C. <robinsjc@dhec.sc.gov>;

Cc:Doerner, Michael (MDoerner@trcsolutions.com) <MDoerner@trcsolutions.com>;

The NBA storage tanks approximate sizing are the following:

Cr1 82000 gallons
Cr2 75000 gallons

In regards to the question to clarify the types of equipment that will be replaced "Replacement of obsolete or end-of-life equipment that will not impact capacity, throughput or emissions It will include equipment for which replacement parts are no longer available and equipment which the inspection services survey prior to the start of construction has determined is worn/corroded enough that it should be replaced for safety reasons."

The main items in that category are piping, instruments & DCS (computer equipment).

Let me know if this clarifies things.

Brent A. Pace, P.E.
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Mobile (419) 303 - 3987

Fwd: LPA Explanation

Pace, Brent A <Brent.Pace@bp.com>

Fri 8/22/2014 2:45 PM

PSD

To:Robinson, James C. <robinsjc@dhec.sc.gov>;

Cc:Michael Doerner <MDoerner@trcsolutions.com>;

1 attachment

LPA Permitting History.docx;

James

Please see the attached description of the Low Pressure Absorber and control vs recovery device. Please let me know if you have any questions. I feel like we may have gone into too much detail but we couldn't figure out how to say this in fewer words without leaving something out.

Brent

Begin forwarded message:

> **From:** "Doerner, Michael" <MDoerner@trcsolutions.com>
> **Subject: LPA Explanation**
> **Date:** August 22, 2014 at 12:15:59 PM EDT
> **To:** "Pace, Brent A (Brent.Pace@bp.com)" <Brent.Pace@bp.com>
> **Cc:** "VandenMeiracker, Robert" <RVandenMeiracker@trcsolutions.com>, "Riley, Mike" <MRiley@trcsolutions.com>, "Bailey, William" <WBailey@trcsolutions.com>
>
> Brent;
>
> Let me know if any questions comments on the attached information to answer James' question.
>
> Michael A. Doerner
> Air Quality Specialist

MDoerner@trcsolutions.com
30 Patewood Dr., Greenville, SC 29615
T: 864.234.9481 | F: 864.281.0288 | C: 864.884.2683

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LPA Permitting History

LPA HON Status

The LPA has not been a HON process vent since it has not met the regulatory definition which reads:

> 63.107(a)
> The owner or operator shall use the criteria specified in this §63.107 to determine whether there are any process vents associated with an air oxidation reactor, distillation unit, or reactor that is in a source subject to this subpart. A process vent is the point of discharge to the atmosphere (or the point of entry into a control device, if any) of a gas stream if the gas stream has the characteristics specified in paragraphs (b) through (h) of this section, or meets the criteria specified in paragraph (i) of this section.
> 63.107(b)
> Some, or all, of the gas stream originates as a continuous flow from an **air oxidation reactor, distillation unit, or reactor** during operation of the chemical manufacturing process unit.

The LPA has historically not had any input streams which have originated from an air oxidation reactor, distillation unit or reactor. However, after the revision included in this PSD permit application the LPA will receive the overhead stream from a distillation unit so the LPA outlet will be a HON process vent and the LPA will be the last recovery device on the HON process vent.

LPA Recovery Device vs Control Device

The LPA has always served the main purpose of recovering valuable acetic acid from several unit process streams before it is vented to the atmosphere. The LPA has historically recovered about $1 MM per year of acetic acid that would have to be replaced if it wasn't recovered in the LPA and recycled back into the process.

BP from the earliest Title V application has viewed the LPA as a recovery device but during the initial Title V permit development the DHEC permit engineer stated the last device before a process stream was released to the atmosphere is a control device. That is why the LPA was included in the list of control devices but BP requested that the description include the wording "Atmospheric Absorber (Recovery Device)" to recognize its true purpose in the process. This description for the LPA has been maintained until the latest permit was issued where the wording "(Recovery Device)" was accidently dropped from the description.

After the construction included in the PSD application the LPA will be receiving the overhead stream from the Dehydration Distillation unit and meet the definition of a HON Recovery Device per the HON regulation.

RE: Word Version of Application

Doerner, Michael <MDoerner@trcsolutions.com>

Tue 8/26/2014 12:31 PM

PSD

To: Robinson, James C. <robinsjc@dhec.sc.gov>;

Cc: brent.pace@bp.com <brent.pace@bp.com>;

2 attachments

R1874640000-011.docx; R1874640000-012.docx;

James;

Attached is a word version of the confidential (11) and Non-confidential (12) version of the application. The CDs are being prepared and will be overnighted to you.

Michael A. Doerner
Air Quality Specialist

MDoerner@trcsolutions.com
30 Patewood Dr., Greenville, SC 29615
T: 864.234.9481 | F: 864.281.0288 | C: 864.884.2683

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From: Pace, Brent A [mailto:Brent.Pace@bp.com]
Sent: Tuesday, August 26, 2014 11:31 AM
To: Doerner, Michael
Subject: Fwd: Word Version of Application

Can you please send a CD to him also. Apparently he needs it.

Brent Pace

Begin forwarded message:

> **From:** "Robinson, James C." <robinsjc@dhec.sc.gov>
> **Date:** August 26, 2014 at 11:15:54 AM EDT
> **To:** "brent.pace@bp.com" <brent.pace@bp.com>
> **Subject: Word Version of Application**

Brent, I do not see the disc for this anywhere. Please send an actual CD since it is mentioned in the cover letter. I also need an electronic copy of this now or ASAP. Thanks!

James C. Robinson, P.E.
Environmental Engineer
BAQ/Engineering Services Division
2600 Bull St., Columbia, SC 29201
Ph: 803-898-0660 Fax: 803-898-4079

International Information

Pace, Brent A <Brent.Pace@bp.com>

Wed 8/27/2014 3:10 PM

PSD

To:Robinson, James C. <robinsjc@dhec.sc.gov>;

Cc:Doerner, Michael (MDoerner@trcsolutions.com) <MDoerner@trcsolutions.com>;

James

Here is the statement we discussed earlier about international facilities.

BP either owns or has joint ventures that are both conventional and new technologies and are located overseas. The conventional facilities have the same technology as Cooper River. The new technologies are not feasible to add to the conventional technology. The result would essentially be a rebuild of the entire facility to the cost of approximately $600 million. There is not any data that BP has on control technologies that are not owned by BP or joint ventures.

Brent A. Pace, P.E.
Environmental Engineer / OMS Coordinator
brent.pace@bp.com
Office (843) 881 – 5182
Mobile (419) 303 - 3987

FW: Appendix B

Pace, Brent A <Brent.Pace@bp.com>

Fri 8/29/2014 1:40 PM

PSD

To:Robinson, James C. <robinsjc@dhec.sc.gov>;

4 attachments

Appendix B Tables-rev.xlsx; Table B-3-Rev.xlsx; Appendix B Tables NC-Rev.xlsx; Table B-3 NC-Rev.xlsx;

See the attached files for the correction on the fugitives. Looks like we had an incorrect link. It doesn't change any of the final numbers, just that lb/hr number. Let me know if you have any questions.

Brent A. Pace, P.E.
Environmental Engineer / OMS Coordinator
brent.pace@bp.com
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Mobile (419) 303 - 3987

From: Doerner, Michael [mailto:MDoerner@trcsolutions.com]
Sent: Friday, August 29, 2014 1:31 PM
To: Pace, Brent A
Subject: Appendix B

Corrected Appendix B and Tables B-3 as a separate file. It does not change any other table in the appendix B.

Michael A. Doerner
Air Quality Specialist

MDoerner@trcsolutions.com
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T: 864.234.9481 | F: 864.281.0288 | C: 864.884.2683

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RE: Good combustion practices

Robinson, James C.

Fri 8/29/2014 10:00 AM

Sent Items

To:brent.pace@bp.com <brent.pace@bp.com>;

Brent, BP will need to provide a definition of Good Combustion Practice, along with the examples. Again, Showa Denka's PD is a good example, or BP can provide it's own definition.

James C. Robinson, P.E.
Environmental Engineer
BAQ/Engineering Services Division
2600 Bull St., Columbia, SC 29201
Ph: 803-898-0660 Fax: 803-898-4079

From: Pace, Brent A <Brent.Pace@bp.com>
Sent: Thursday, August 28, 2014 3:04 PM
To: Robinson, James C.
Cc: Doerner, Michael (MDoerner@trcsolutions.com)
Subject: RE: Good combustion practices

Our opinion is that Tune Ups for the boilers does constitute Good Combustion Practices. If this does not satisfy the requirement, then we suggest putting the following in:

1. Good air/fuel mixing in the combustion zone;
2. Sufficient residence time to complete combustion;
3. Operator and maintenance practices including good burner maintenance and operation

Let me know your thoughts James.

Brent A. Pace, P.E.
Environmental Engineer / OMS Coordinator
brent.pace@bp.com
Office (843) 881 – 5182
Mobile (419) 303 - 3987

From: Robinson, James C. [mailto:robinsjc@dhec.sc.gov]
Sent: Monday, August 25, 2014 1:45 PM
To: Pace, Brent A
Subject: RE: Good combustion practices

I see it. A couple of things. This doesn't spell out what good combustion practice is. There seems to be a

reciprocal discussion on good combustion and tune ups. To us (BAQ) good combustion practice and tune-ups are two separate things. Please look at Showa Denka's PD for a great example.

The second thing is that good combustion practice needs to be placed in the section with the other control technologies.

James C. Robinson, P.E.
Environmental Engineer
BAQ/Engineering Services Division
2600 Bull St., Columbia, SC 29201
Ph: 803-898-0660 Fax: 803-898-4079

From: Pace, Brent A <Brent.Pace@bp.com>
Sent: Monday, August 25, 2014 1:21 PM
To: Robinson, James C.
Subject: Good combustion practices

Check out Section 4.9.4 on page 4-45. We describe good combustion practices in this section.

Brent A. Pace, P.E.
Environmental Engineer / OMS Coordinator
brent.pace@bp.com
Office (843) 881 – 5182
Mobile (419) 303 - 3987

Question on a comment on the PD

Pace, Brent A <Brent.Pace@bp.com>

Thu 9/4/2014 12:40 PM

PSD

To:Robinson, James C. <robinsjc@dhec.sc.gov>;

James

I'd not sure what part of this comment means (M. Doerner comments is in red). There is a reason why the scrubber was not used alone so we paired with a condenser. Let's chat about this. Hope your week is going well.

Shall we set a time next week to discuss comments?

Brent

Not sure what BP is doing. There is inconsistency in application, as far as control combinations. Some have been talked about but not analyzed for BACT.

Shouldn't this have been done through the BACT analysis?

MAD- A scrubber by itself wouldn't work due to all the water flooding out a scrubber. Would ned a condenser before the scrubber to knock out water.
Also need condenser (dehumidification) before biofilter to get it to operate.

Not sure what he means by some have been talked about but not analyzed.

Brent A. Pace, P.E.
Environmental Engineer / OMS Coordinator
brent.pace@bp.com
Office (843) 881 – 5182
Mobile (419) 303 - 3987

RE: Word Version of Appendix A - DHEC Application- NC

Doerner, Michael <MDoerner@trcsolutions.com>

Thu 9/11/2014 4:57 PM

PSD

To:brent.pace@bp.com <brent.pace@bp.com>;

Cc:Robinson, James C. <robinsjc@dhec.sc.gov>;

8 attachments

Appendix A Form 00.doc; Appendix A Form 01.doc; Appendix A Form 02-REV.doc; Appendix A Form 03.doc; Appendix A Form 04.doc; Appendix A Form 05-REV.doc; Appendix A Form 06.doc; Appendix A Form 07.doc;

Attached is Non-Confidential version of Appendix A.

Michael A. Doerner
Air Quality Specialist

MDoerner@trcsolutions.com
30 Patewood Dr., Greenville, SC 29615
T: 864.234.9481 | F: 864.281.0288 | C: 864.884.2683

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From: Pace, Brent A [mailto:Brent.Pace@bp.com]
Sent: Thursday, September 11, 2014 11:28 AM
To: Doerner, Michael
Subject: FW: Word Version of Appendix A - DHEC Application

Brent A. Pace, P.E.
Environmental Engineer / OMS Coordinator
brent.pace@bp.com
Office (843) 881 – 5182
Mobile (419) 303 - 3987

From: Robinson, James C. [mailto:robinsjc@dhec.sc.gov]
Sent: Thursday, September 11, 2014 11:22 AM
To: Pace, Brent A

Subject: Word Version of Appendix A - DHEC Application

Hey Brent do you all have a word version of Appendix A you can send me? If so, please do. Thanks!

James C. Robinson, P.E.
Environmental Engineer
BAQ/Engineering Services Division
2600 Bull St., Columbia, SC 29201
Ph: 803-898-0660 Fax: 803-898-4079

FW: BP CR PSD - Statement of Basis

Pace, Brent A <Brent.Pace@bp.com>

Fri 9/12/2014 2:37 PM

PSD

To:Robinson, James C. <robinsjc@dhec.sc.gov>;

1 attachment

ber029cu.sob draft 2-md.doc;

James

Find attached the Statement of Basis and our comments. Let me know if you have any questions on either this or the PD.

Brent A. Pace, P.E.
Environmental Engineer / OMS Coordinator
brent.pace@bp.com
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Mobile (419) 303 - 3987

From: Doerner, Michael [mailto:MDoerner@trcsolutions.com]
Sent: Friday, September 12, 2014 12:16 PM
To: Pace, Brent A
Cc: VandenMeiracker, Robert; Riley, Mike; Bailey, William
Subject: BP CR PSD - Statement of Basis

Brent;

Attached is marked up with my comments.

Michael A. Doerner
Air Quality Specialist

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RE: cha029cu pd draft 9-12-14-bp-DHEC2.doc

Robinson, James C.

Mon 9/15/2014 7:47 AM

Sent Items

To:brent.pace@bp.com <brent.pace@bp.com>;

Cc:Doerner, Michael (MDoerner@trcsolutions.com) <MDoerner@trcsolutions.com>;

Brent, my apologies, I should have left those numbers out, as they came from the Title V permit's SOB. Thanks for checking the process weight rates!

James C. Robinson, P.E.
Environmental Engineer
BAQ/Engineering Services Division
2600 Bull St., Columbia, SC 29201
Ph: 803-898-0660 Fax: 803-898-4079

From: Pace, Brent A <Brent.Pace@bp.com>
Sent: Friday, September 12, 2014 4:55 PM
To: Robinson, James C.
Cc: Doerner, Michael (MDoerner@trcsolutions.com)
Subject: RE: cha029cu pd draft 9-12-14-bp-DHEC2.doc

The PM allowable and the Process Weight Rate are correct. I am having difficulty seeing where the Uncontrolled and Controlled Emission numbers are coming from. I tried to match them up to Appendix B but couldn't. Can you give me some guidance on where to look to verify? Thanks.

Brent A. Pace, P.E.
Environmental Engineer / OMS Coordinator
brent.pace@bp.com
Office (843) 881 – 5182
Mobile (419) 303 - 3987

From: Robinson, James C. [mailto:robinsjc@dhec.sc.gov]
Sent: Friday, September 12, 2014 3:59 PM
To: Pace, Brent A
Cc: Doerner, Michael (MDoerner@trcsolutions.com)
Subject: RE: cha029cu pd draft 9-12-14-bp-DHEC2.doc

Brent, the Standard 4 table comment was not addressed. Please take a look at that. Thanks!

James C. Robinson, P.E.

Environmental Engineer
BAQ/Engineering Services Division
2600 Bull St., Columbia, SC 29201
Ph: 803-898-0660 Fax: 803-898-4079

From: Pace, Brent A <Brent.Pace@bp.com>
Sent: Friday, September 12, 2014 2:39 PM
To: Robinson, James C.
Cc: Doerner, Michael (MDoerner@trcsolutions.com)
Subject: RE: cha029cu pd draft 9-12-14-bp-DHEC2.doc

Sounds good. There are a couple things in the PD that we sent that you might need to reference for the construction permit such as the monitoring for the good combustion practices. Good luck on the draft permit!

Brent A. Pace, P.E.
Environmental Engineer / OMS Coordinator
brent.pace@bp.com
Office (843) 881 – 5182
Mobile (419) 303 - 3987

From: Robinson, James C. [mailto:robinsjc@dhec.sc.gov]
Sent: Friday, September 12, 2014 2:38 PM
To: Pace, Brent A
Cc: Doerner, Michael (MDoerner@trcsolutions.com)
Subject: RE: cha029cu pd draft 9-12-14-bp-DHEC2.doc

Thanks Brent! As we mentioned yesterday, the plan is to draft the contruction permit and send to you before I go back to the PD.

James C. Robinson, P.E.
Environmental Engineer
BAQ/Engineering Services Division
2600 Bull St., Columbia, SC 29201
Ph: 803-898-0660 Fax: 803-898-4079

From: Pace, Brent A <Brent.Pace@bp.com>
Sent: Friday, September 12, 2014 2:34 PM
To: Robinson, James C.
Cc: Doerner, Michael (MDoerner@trcsolutions.com)
Subject: cha029cu pd draft 9-12-14-bp-DHEC2.doc

James

Please see the attached PD with our comments. I think we have the good combustion part nailed down. Take a look and let me know what you think. Statement of Basis is on its way back to you shortly.

Brent

RE: Conference Call

Pace, Brent A <Brent.Pace@bp.com>

Tue 9/23/2014 1:20 PM

Inbox

To:Robinson, James C. <robinsjc@dhec.sc.gov>;

James

Mike will be sending out a meeting notice with call in number for you, me, Veronica, Denise and Mike for Thursday at 10 am. Look forward to talking and seeing the permit.

Thinking that for the Crystallizer Vent Scrubber that we monitor pressure drop once a day on the #1 scrubber, and we measure water flow on the #2 Vent Scrubber, just as we do today.

Brent A. Pace, P.E.
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From: Robinson, James C. [mailto:robinsjc@dhec.sc.gov]
Sent: Tuesday, September 23, 2014 1:04 PM
To: Pace, Brent A
Subject: Conference Call

Hey Brent I left you a voicemail on your office phone. We'd like to discuss a few things with you for clarification. Should be sending you the draft permit today or by mid morning tomorrow.

James C. Robinson, P.E.
Environmental Engineer
BAQ/Engineering Services Division
2600 Bull St., Columbia, SC 29201
Ph: 803-898-0660 Fax: 803-898-4079

ber029cu permit draft 3-md.doc

Pace, Brent A <Brent.Pace@bp.com>

Thu 9/25/2014 9:29 AM

Inbox

To:Doerner, Michael (MDoerner@trcsolutions.com) <MDoerner@trcsolutions.com>; Robinson, James C. <robinsjc@dhec.sc.gov>;

1 attachment

ber029cu permit draft 3-md.doc;

James

Here are our comments for our discussion this morning. Not to many! Permit looked really good overall! Just a couple of minor clarifications I think and a couple of questions.

brent

ber029cu permit draft 3-md2.doc

Pace, Brent A <Brent.Pace@bp.com>

Thu 9/25/2014 4:17 PM

Inbox

To:Robinson, James C. <robinsjc@dhec.sc.gov>;

1 attachment

ber029cu permit draft 3-md2.doc;

James

We have added some language to the heater section. After going back and doing some checking we did some minor tweaks instead of the big revision that I thought we would do. Based on the heater/boiler MACT there is a lot of things that can be considered tune ups, and we will include those in the plan that is referenced to be written in D.12. Shutting down the heater is not required for a tune up and that was my concern.

Brent

Visual Observation Frequency

Pace, Brent A <Brent.Pace@bp.com>

Fri 9/26/2014 12:44 PM

Inbox

To:Robinson, James C. <robinsjc@dhec.sc.gov>;

Cc:Doerner, Michael (MDoerner@trcsolutions.com) <MDoerner@trcsolutions.com>;

This is in response to the proposed daily visual observations for opacity on the CATOX vents, Low Pressure Absorber Vents, and the Crystallizer Vent Scrubber Vents.

BP believes that weekly visual observations will be sufficient to ensure compliance with the opacity requirements. BP has performed daily visual observations for greater than 5 years on all of the vents referenced above, and have not had one exceedance for opacity. All of the vents pass through a wet scrubber and therefore the only visual observation is of water vapor in the vent. BPs current Title V has a requirement for semi annual observations, but BP exceeds this and performs these daily. BP proposes to be held to weekly visual observations for compliance in the PSD Permit, though BP intends to still perform these inspections on a daily basis.

James, let me know if this is sufficient.

Brent A. Pace, P.E.
Environmental Engineer / OMS Coordinator
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Mobile (419) 303 - 3987

Fwd: BACT limits for Fired Heater

Pace, Brent A <Brent.Pace@bp.com>

Mon 9/29/2014 9:36 AM

PSD

To:Robinson, James C. <robinsjc@dhec.sc.gov>;

1 attachment

image001.jpg;

From mike.

Brent Pace

Begin forwarded message:

From: "Doerner, Michael" <MDoerner@trcsolutions.com>
Date: September 29, 2014 at 9:21:49 AM EDT
To: "Pace, Brent A" <Brent.Pace@bp.com>
Subject: RE: BACT limits for Fired Heater

Brent;

The BACT limits were based on the AP-42 emission factors for natural gas combustion (per AP-41 Chapter 1.4 Tables 1.4.1 & 1.4.2) of 5.5 lb/MM SCF and 84 lb/MM SCF for VOC and CO respectively and a heat content of 1000 BTU/scf.
VOC = 5.5 lbs/MM SCF x scf/1000 btu = 5.5/1000 = 0.0055 lbs/MM Btu
CO = 84 lbs/MM SCF x scf/1000 btu = 84/1000 = 0.084 lbs/MM Btu

Let me know if he needs more write-up than this info.

Michael A. Doerner
Air Quality Specialist

MDoerner@trcsolutions.com
30 Patewood Dr., Greenville, SC 29615
T: 864.234.9481 | F: 864.281.0288 | C: 864.884.2683

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From: Pace, Brent A [mailto:Brent.Pace@bp.com]
Sent: Monday, September 29, 2014 8:29 AM

To: Doerner, Michael
Subject: Fwd: BACT limits for Fired Heater

Brent Pace

Begin forwarded message:

> **From:** "Robinson, James C." <robinsjc@dhec.sc.gov>
> **Date:** September 29, 2014 at 7:45:21 AM EDT
> **To:** "brent.pace@bp.com" <brent.pace@bp.com>
> **Subject: BACT limits for Fired Heater**
>
> Brent, we need a written discussion of how BP derived the VOC and CO limits for the Fired Heater. This will be added to the PD.

James C. Robinson, P.E.
Environmental Engineer
BAQ/Engineering Services Division
2600 Bull St., Columbia, SC 29201
Ph: 803-898-0660 Fax: 803-898-4079

Emailing: ber029cu pd draft (9-26-14)_jcr-md.doc, ber029cu draft (9-26-14)_jcr-md.doc, ber029cu sob draft (9-26-14)_jcr-md (3).doc

Pace, Brent A <Brent.Pace@bp.com>

Tue 9/30/2014 11:14 AM

Inbox

To:Robinson, James C. <robinsjc@dhec.sc.gov>;

3 attachments

ber029cu pd draft (9-26-14)_jcr-md.doc; ber029cu draft (9-26-14)_jcr-md.doc; ber029cu sob draft (9-26-14)_jcr-md (3).doc;

James

Give me a call to discuss a couple of these items. I'll be in the office the rest of the day.

Your message is ready to be sent with the following file or link attachments:

ber029cu pd draft (9-26-14)_jcr-md.doc
ber029cu draft (9-26-14)_jcr-md.doc
ber029cu sob draft (9-26-14)_jcr-md (3).doc

Note: To protect against computer viruses, e-mail programs may prevent sending or receiving certain types of file attachments. Check your e-mail security settings to determine how attachments are handled.

RE: Total PM emissions for CR#1 and CR#2

Pace, Brent A <Brent.Pace@bp.com>

Tue 9/30/2014 3:42 PM

Inbox

To:Robinson, James C. <robinsjc@dhec.sc.gov>;

James

Mike found an error in what he was doing and agrees with your numbers.

Brent A. Pace, P.E.
Environmental Engineer / OMS Coordinator
brent.pace@bp.com
Office (843) 881 – 5182
Mobile (419) 303 - 3987

From: Robinson, James C. [mailto:robinsjc@dhec.sc.gov]
Sent: Tuesday, September 30, 2014 3:08 PM
To: Pace, Brent A
Subject: Total PM emissions for CR#1 and CR#2

attached is my spreadsheet calculating PM emissions from these two units. I pull this information from the Appendix B emission calcs.

James C. Robinson, P.E.
Environmental Engineer
BAQ/Engineering Services Division
2600 Bull St., Columbia, SC 29201
Ph: 803-898-0660 Fax: 803-898-4079

Updated process description

Pace, Brent A <Brent.Pace@bp.com>

Thu 10/2/2014 6:57 PM

Inbox

To:Robinson, James C. <robinsjc@dhec.sc.gov>;

1 attachment

ber029cu.pd draft_jcr (10-1-14)-md.doc;

(NESHAPs) from the SOCMI"

- 40 CFR 63, Subpart G "NESHAPs From the SOCMI Process Vents, Storage Vessels, Transfer Operations, and Wastewater"
- 40 CFR 63, Subpart H "NESHAPs for Equipment Leaks"
- 40 CFR 63, Subpart ZZZZ "National Emission Standards for Hazardous Air Pollutants (NESHAPs) for Stationary Reciprocating Internal Combustion Engines (RICE)"
- 40 CFR 63, Subpart DDDDD "NESHAPs for Industrial, Commercial, and Institutional Boilers and Process Heaters"
- 40 CFR Part 64 "Compliance Assurance Monitoring (CAM)"

III. Detailed Process Description (Prior to Modification)

BPCR is a chemical manufacturing facility located in Wando, South Carolina that produces purified terephthalic acid (PTA). PTA is a white, inert powder used to make polyester fibers, bottles, and films. The major raw materials in the production of PTA are Paraxylene (Px), acetic acid, caustic soda, and hydrogen. Plant operation consists mainly of: 1) utilities 2) production of crude TA, 3) purification into PTA, 4) product loading/shipping, and 5) waste treatment along with some additional areas at the plant. There are two units that manufacture PTA: Cooper River #1 (CR#1), which consists of the #1 Oxidation (OX) Unit and the #1 PTA Unit; and Cooper River #2 (CR#2), which consists of the #2 Oxidation (OX) Unit and the #2 PTA Unit. The #1 and #2 OX Units produce crude TA and the #1 and #2 PTA Units purify the crude TA, to make PTA.

#1 & #2 Oxidation Units

In each Oxidation (OX) unit, a BPCR proprietary process is used for the catalytic liquid phase air oxidation of paraxylene (PX) to produce crude terephthalic acid (TA). Acetic acid (HAC), ~~PX,~~ and catalyst solution are mixed in a feed mix drum. The feed mix from the drum, PX by direct injection, and air from the process air compressor are continuously fed to the reactors. Exothermic heat from the reaction is removed by flashing off and then~~by~~ condensing the boiling reaction solvent. A portion of this condensate is withdrawn to control the water concentration in the reactor and the remainder is refluxed back to the reactor.

Reactor effluent is depressurized and cooled to filtering conditions in a series of crystallizers. Air is fed to the first crystallizer for additional reaction. The crystallizer temperatures are controlled by allowing a portion of the reaction solvent to flash off. The crystallizer vent streams are sent to the dehydration tower (DHT) or the high pressure absorber (HPA) for recovery of valuable materials. The DHT also removes water formed in the reaction. The DHT is an azeotropic distillation system with the vent streams from the system being sent thru two stage scrubbing to recover PX and HAC before being vented to the atmosphere at the LPA. The excess reaction water removed by the DHT system is sent to wastewater treatment. The crystallizer precipitate, TA, is recovered by filtration and finally dried. The dried TA solids are conveyed to the OX intermediate storage silos (TA silos) and stored for additional processing in the PTA unit.

The off-gas from the OX reactors is sent ~~combined with the DHT overhead gases that have been compressed in the low pressure vent gas treatment (LPVGT) equipment. The combined gases pass~~ through a recovery device, the HPA, before being sent to a control device, the high pressure vent gas treatment system (HPVGTS) in which CO, VOC, and HAP are nearly totally destroyed and emitted

to the atmosphere. The HPVGTS reactor contains catalyst bricks that are routinely changed out based on their activity and mechanical condition. Further processing in the OX unit is required to recover and purify HAC from the reactor outlet, crystallizer solvent withdrawal streams, and also from the un-recycled mother liquor stream. ~~OX byproducts are separated from the HAC in an evaporation process and then purged.~~

#1 & #2 Purified Terephthalic Acid Units

The purified terephthalic acid (PTA) unit is also a continuous operation. Crude terephthalic acid (TA) is fed from the TA silos to the feed slurry drum to produce a slurry of TA crystals and water. The slurry is heated to dissolve the TA and then the slurry enters the hydrogenation reactor where it reacts to convert the impurities into a form that can be separated from the product. The PTA reactor catalyst is routinely changed out based on its activity and mechanical condition. After reaction, the solution goes through a cycle of lowering the pressure and cooling to crystallize the PTA. A portion of the aromatic acids in the mother liquor are recovered by cooling and filtering the mother liquor; the aromatic acids are recycled back to the OX reaction unit.

The crystallized PTA is recovered from the mother liquor by separation in the filtration section of the unit. The final product is dried and transferred to the PTA day silos and then to the PTA product storage silos.

Product Loading and Shipping

The PTA storage system is comprised of six large silos that are used to manage product transfers, packaging, loading and shipping. Shipping personnel package the product from the large silos into various containers and ship it to the customers.

IV. Significant Emission Rates

As shown in Table IV-1, this project exceeds the significant threshold as defined under PSD for CO and VOC emissions. Emissions calculations for the modified units were based on actual-to-potential test to determine if there was a significant emissions increase.

Table IV-1. PSD Applicability Analysis

Pollutant	Controlled Emissions Increase	PSD Significant Threshold	Significant Increase?
	TPY	TPY	
PM	7.0	25	No
PM_{10}	6.6	15	No
$PM_{2.5}$	5.8	10	No
SO_2	0.2	40	No
NO_X	27.8	40	No
CO	644.8	100	Yes
VOC	200.3	40	Yes
CO_2e	17,300	75,000	No